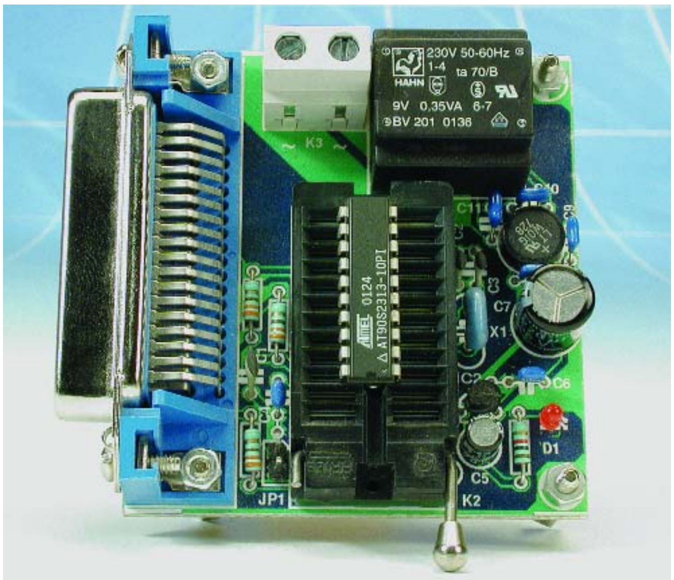
AT90S2313 Programmer

035



COMPONENTS LIST

Resistors:
R1,R2,R3 = 330Ω
R4 = 1kΩ

Capacitors:
C1 = 100pF
C2,C3 = 33pF
C4,C6 = 100nF ceramic
C5 = 10µF 63V radial
C7 = 220µF 25V radial
C8-C11 = 22 nF ceramic

Semiconductors:
B1 = B80C1500, round case (80V piv, 1.5A)
D1 = LED
IC1 = AT90S2313
IC2 = 78L05

Miscellaneous:
JP1 = 2-way pinheader with jumper
K1 = Centronics socket (female), PCB mount, angled pins
K2 = 24-pin ZIF-socket (e.g., Farnell # 178-235) or 20-pin IC socket with turned pins
K3 = 2-way PCB terminal block, lead pitch 7.5 mm
X1 = 4MHz quartz crystal
TR1 = mains transformer 9 V/0.35 VA (e.g., Hahn BV201 0136)
PCB, order code **034036-1**

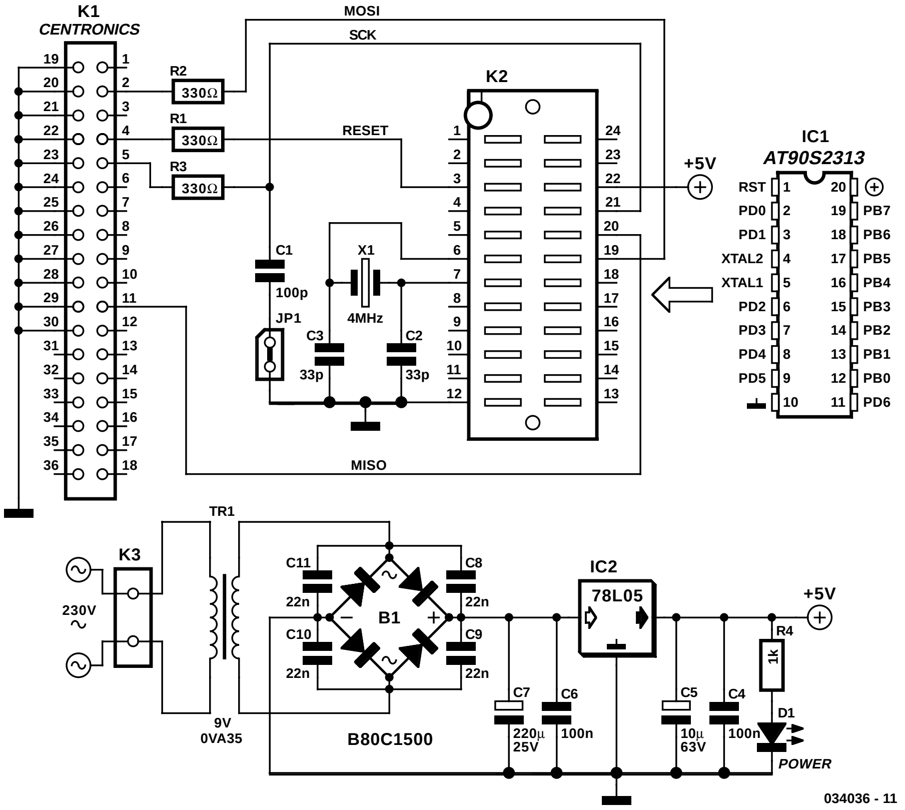
T. Giesberts

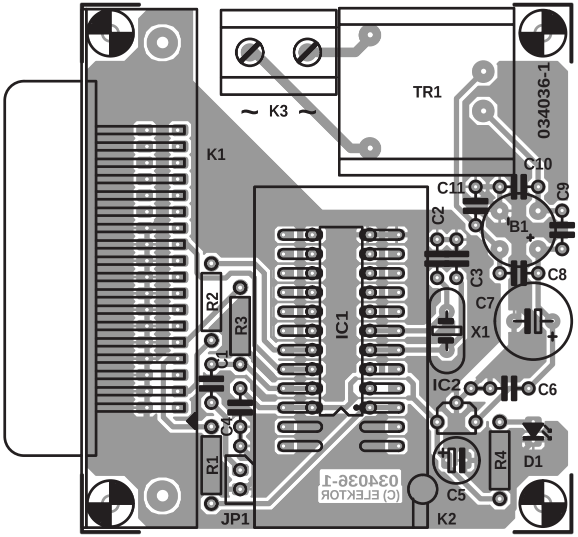
In January 2003, we published an article about programming AVR microcontrollers using Bascom AVR. In that article and in the manual for this Basic compiler, a circuit from *Sample Electronics* is described as one of the simplest ways to program the microcontroller. This circuit provided the basis for the practical implementation described here.

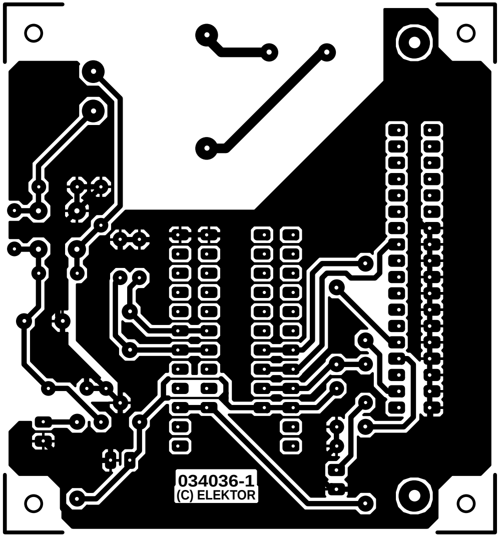
For this purpose, the parallel port of the PC is directly connected to the 'Serial Interface for In-system Programming' (SPI) via resistors that protect the parallel port. The serial link to the internal Flash memory is enabled when the Reset signal (pin 1) is low. The three connections for the SPI interface are SCK, MISO (output) and MOSI (input), which are located on pins 19, 18 and 17 of the microcontroller, respectively. The 100-pF capacitor (C1) is intended to avoid potential timing problems. It can be connected between the SCK line and ground using jumper JP1. However, during our tests this proved not to be necessary.

To make building and connecting this programmer as easy as possible, a Centronics connector is located on the associated printed circuit board to allow a standard parallel printer cable to be used to connect the programmer to a PC. If you want to program multiple microcontrollers, it is highly recommended to use a zero insertion force (ZIF) socket. If you want to build a less expensive version, you can also use a normal IC socket. The design of the printed circuit board allows only one socket to be fitted.

The circuit has a small 5-V supply, consisting of a tiny 0.35-VA transformer, a bridge rectifier and a 78L05 voltage regulator (IC2). Capacitors C4, C6 and C8–C11 suppress any interference that may be present. The power indicator LED D1 also acts as a minimum load for the voltage regulator, in order to prevent the voltage







from rising excessively in the absence of a load, which is a problem with some types.

The programmer should preferably be connected while the PC is switched off. This is in any case always a good idea when connecting equipment to the parallel port of a PC, in order to avoid damage to the hardware. After the programmer is connected, switch on the PC and the programmer and start Bascom AVR. The program should select the *Sample Electronics* programmer by default. If this doesn't happen, look under Options/Programmer to verify that the address of the parallel port (LPT address) is properly configured.

(034036-1)

(based on an idea from *Sample Electronics*)